

CLAIMS

1. A TM₀₁₀ mode resonator device comprising:

a dielectric substrate;

electrodes formed on both surfaces of the dielectric substrate, at least one of

the electrodes being a circular electrode; and

a plurality of through holes passing through the dielectric substrate and formed

around the circular electrode in the dielectric substrate, the inside of

each through hole having no electrode as no electrode-formed portion,

wherein an open-circuited end for improving confinement of an

electromagnetic field is provided around the circular electrode by using

the plurality of through holes.

2. A TM₀₁₀ mode resonator device as claimed in claim 1, wherein, when the

wavelength of a resonance frequency in the dielectric substrate is represented by λ_g ,

the space between neighboring through holes is set to be $\lambda_g/4$ or less.

3. A TM₀₁₀ mode resonator device comprising:

a dielectric substrate;

electrodes formed on both surfaces of the dielectric substrate, at least one of

the electrodes being a circular electrode; and

a plurality of strip electrodes disposed so as to radially extend around the

circular electrodes formed on both surfaces or the circular electrode

formed on one surface of the dielectric substrate so as to have a space

between the circular electrodes or the circular electrode and the

plurality of strip electrodes.

4. A TM₀₁₀ mode resonator device as claimed in claim 3, wherein, when the

wavelength of a resonance frequency in the dielectric substrate is represented by λ_g ,

the length of the radially extending strip electrodes is $\lambda_g/4$ and the strip electrode is

rectangular in shape.

5. A TM010 mode resonator device as claimed in claim 3 or 4, wherein the space between neighboring strip electrodes is set to be $\lambda g/4$ or less.
6. An oscillator device using a TM010 mode resonator device as claimed in any one of
5 claims 1 to 5.
7. A transmission and reception device using a TM010 mode resonator device as claimed in any one of claims 1 to 5.